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DECEMBER 24, 1949

SCIENCE NEWS LETTER

In This Issue—SCIENCE REVIEW OF THE YEAR

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Nova Via Palomar

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TECHNICAL

ENTOMOLOGY

DDT Conditioning Theory

Development of resistance to DDT in mosquitoes is likened to morphine addiction in humans. Old DDT deposits are probably the source of the chemical causing resistance.

► DEVELOPMENT of resistance to DDT in house flies and mosquitoes comes about in much the same way as morphine addiction in humans.

This explanation of a new theory of DDT "conditioning" as the cause for resistance to the insecticide was presented by Dr. R. W. Fay of the Communicable Disease Center, U. S. Public Health Service, at the meeting of the Entomological Society of America in Tampa, Fla. Dr. Fay is stationed at the Center's Technical Development Division at Savannah, Ga.

DDT resistance may result, Dr. Fay believes, because the insects, by coming in contact with amounts of the chemical too small to kill, become conditioned so that they can withstand increasingly large doses. Comparing the situation to morphine addiction, he said:

"At first a person can tolerate only a small amount of morphine. But ever larger amounts are necessary for a 'kick.' Eventually, a person can take 100 times his first dose, and still he won't feel it."

Animals receiving small amounts of DDT are able to handle the poison by storing it in the fat tissues of the body,

he said. In insects, the DDT might be transmitted in the fat content of the eggs maturing in the bodies of the females.

Old DDT deposits are probably the source of the chemical making insects resistant, Dr. Fay speculated.

Reports from Egypt, Greece, Italy, Sweden and Denmark as well as the United States show that house flies have shown resistance to DDT. Two species of pest mosquitoes in this country, one in Florida, the other in California, have also been reported DDT-resistant. One species of *Anopheles* mosquito, the malaria carrier, is not being controlled to the same degree in South America as in former years, Dr. Fay reported.

"In contrast to these observations," he said, "we have *Anopheles* species which are still showing no resistance to DDT after periods of four and five years of control programs. Programs involving the control of fleas, blow flies, stable flies and horn flies are still showing good results."

If adult flies of field strains are held in the laboratory, free from any insecticidal deposits, Dr. Fay said, resistance disappears completely in four to 10 generations.

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MEDICINE

Vitamin B₁₂ Aids Growth

The growth of undernourished children is stimulated by daily doses of vitamin B₁₂. This vitamin has been used chiefly before for its good effects in anemia and sprue.

► A NEW way to make puny, undernourished children grow and gain has been discovered by scientists at the Children's Fresh Air Camp and Hospital in Cleveland, Ohio.

The method consists in feeding them daily doses of a relatively new vitamin, B₁₂. Heretofore this vitamin has been known and used chiefly for its good effects in pernicious anemia and sprue, although originally it was discovered as a chemical that promoted growth in bacteria.

"Dramatic" responses by five of 11 children fed the vitamin are reported by the Cleveland scientists in the journal, *SCIENCE* (Dec. 16). The scientists are Drs. Norman C. Wetzel, Warren C. Fargo, Isabel H. Smith and Josephine Helikson.

The vitamin was fed every morning to six boys and five girls between the ages of five and 12. They were all under care

at the institution for varying degrees of malnutrition and growth failure. In addition to the vitamin doses, all the children were continued on whatever programs of rest, exercise and diet they had been following in efforts to improve their growth and physique.

Before getting the vitamin, the children had showed no characteristic or even suggestive signs in hair, skin, eyes, mouth or nervous system that could be ascribed to vitamin lack, and all were presumably getting all the vitamins needed for normal growth.

After getting the vitamin the children not only showed a change in growth rate but also had more physical vigor. They were more alert and behaved better. And they demanded second helpings, whereas before they had had poor appetites.

The "most dramatic general effects" were

shown by a boy with severe allergic bronchitis, the doctors report. For a year he had been awakened regularly at night by severe asthmatic attacks. His daytime wheezing was so bad it cut down his desire for food and even his time for eating it.

After being put on the vitamin treatment, his symptoms "simply vanished during the first week, to the surprise of every attendant, lay or professional," the scientists report.

They suggest further investigation on "what possible connections" there may be between vitamin B₁₂ and allergies.

Science News Letter, December 24, 1949

BIOCHEMISTRY

Radioactive Alcohol Is Tried on Rats

► RADIOACTIVE alcohol is the new research tool being used by scientists at the Scripps Metabolic Clinic, La Jolla, Calif., to learn more about how your body handles the alcohol in your Christmas eggnog, cocktails or other alcoholic drinks.

A large part, 75%, of the alcohol is burned to carbon dioxide within five hours. Almost all of it, 90%, is burned in 10 hours, they find.

The studies were made on rats. Some were normal rats and others had been "habituated" to alcohol in their diet and might therefore be considered something like some humans who have developed a type of tolerance to alcohol.

The habituated rats, however, did not burn alcohol any faster than the teetotallers among the animals. This suggests that tolerance is a matter of decreased nerve sensitivity rather than increased ability to dispose of alcohol.

Surprising to the scientists was the finding that the kidneys have a high capacity for oxidizing, or burning, alcohol. Heretofore it has been generally concluded that the kidney did not take part in the first stages of alcohol burning, and that this went on almost exclusively in the liver. Rats may be different from other animals in this regard, the scientists suggest, but they think it more likely that the kidney's alcohol-burning activity has been overlooked. The rat has about seven times as much liver tissue as kidney and this would give the rat liver a four-to-eight-fold advantage over the kidney in ability to burn alcohol.

The radioactive alcohol was made by fermentation with baker's yeast of corn syrup containing radioactive carbon 14. When the alcohol was burned in the rat's body to carbon dioxide, the radioactive carbon 14 in the carbon dioxide gave the scientists an accurate measure of the rate of burning of the alcohol.

The studies are reported by Dr. Grant R. Bartlett and Harry N. Barnet of the Scripps Metabolic Clinic in the *QUARTERLY JOURNAL OF ALCOHOL STUDIES* (Dec.).

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MEDICINE

New Relief for Arthritics

A gland chemical and vitamin combination may substitute for cortisone and ACTH in arthritic treatment. Good results of this treatment are reported.

► A COMBINATION of a plentiful gland chemical and a vitamin may become a substitute for scarce cortisone and ACTH in treatment of arthritis.

Good results with this treatment are reported by Drs. E. Lewin and E. Wassen, of Sahlgren's Hospital, Gothenburg, Sweden, in the LANCET (Nov. 26), British medical journal.

The gland chemical they used is from the adrenal gland cortex, which is also the source of cortisone. But it is a different chemical, known as desoxycorticosterone acetate. The vitamin is ascorbic acid, or vitamin C.

Both vitamin and gland chemical were given by injection, the gland chemical into the muscles and the vitamin into the veins. Within five minutes joint pain in arthritis patients began to ease and the joints could be moved more readily. Fifteen to 20 minutes later, the pain had practically disappeared. The joints could be moved as much as the wasting of muscles and changes in the joints from the disease would allow.

All of the nine patients given this treatment reacted in the same way.

"In some cases the improvement was astounding," the Swedish doctors report. "One of the patients was completely crippled by pain and contractures after rheumatoid arthritis for 15 years. After one combined injection, she sat up with ease and moved her arms and legs about freely. All her pain had gone. It was noted that the skin became warmer and redder in the articular (joint) regions after the injection.

"Some patients became greatly exhilarated after the injections, more than one would expect," the doctors state, "from the mere relief of pain.

"The effect lasted from one to six hours, occasionally more than 24 hours. It seems as though it lasts longer with each further injection. In more acute cases one or two injections have been enough to banish the pain for two or three weeks (the present observation period)."

The good results with desoxycorticosterone are "unexpected," the LANCET editor points out. The Canadian scientist, Dr. Hans Selye of Montreal, has found that rats treated with this hormone over a long period often developed arthritis.

An American scientist, Dr. Edward F. Rosenberg of Chicago, tried this hormone in arthritis patients and found it of no benefit.

The Swedish doctors seem to have changed this chemical's action "profoundly,"

the LANCET editor states, by giving it with vitamin C. But the editor warns that much more work will be needed before their observations on patients can be reconciled with Dr. Selye's experimental work.

If the Swedish doctors' results are confirmed, the editor states, "the discovery will be a great step forward" because desoxy-

corticosterone is made synthetically and is relatively plentiful, as is also vitamin C, whereas both cortisone and ACTH are rare and likely to remain so.

Vitamin C, the Swedish doctors found, was not effective in combination with the gland chemical when the vitamin was given by mouth.

Relief obtained from the combined treatment lasted four days after a pellet, or pill, of the gland chemical was implanted in the muscles of the patient and the vitamin injections were given every sixth to eighth hour. At the time of their report this had been tried only in one patient and only four days had elapsed since the pellet was planted in the patient's body.

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GENERAL SCIENCE

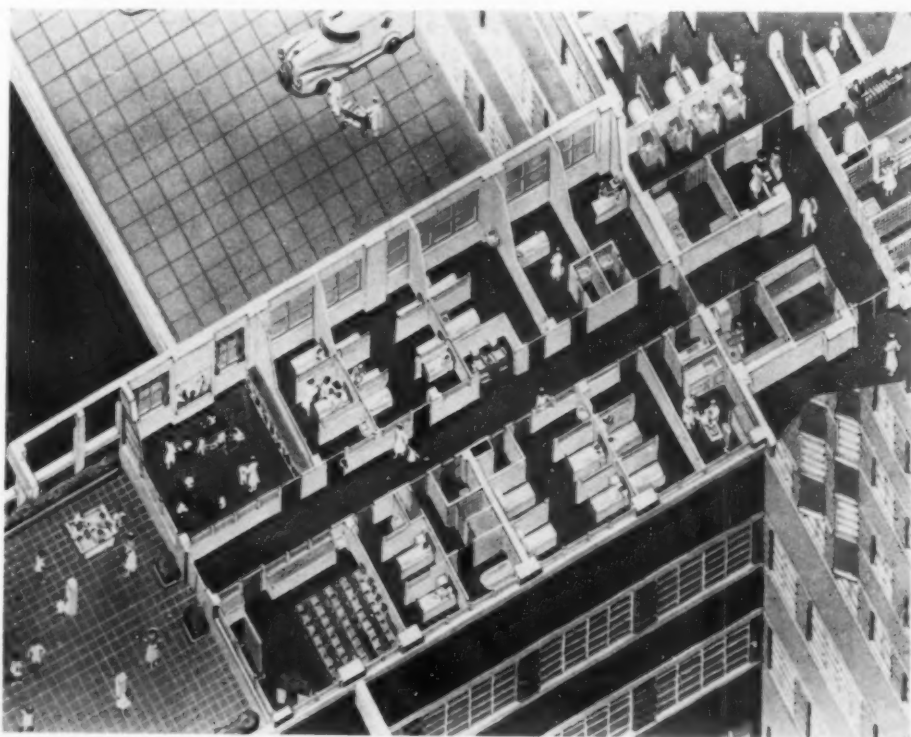
Unified Science Is Possible

► THE welding together of all the sciences into one "unified science" lies in the imminent future. It is being made possible by the discovery of certain principles of interaction between things, beings, and groups, which are applicable to all sciences.

These ideas were presented at Yale University's Osborn Biological Laboratory in New Haven, Conn., by Edward F. Haskell,

research associate of the Foundation for Integrated Education.

By reducing the basic axioms and concepts of a given science, such as biology, to mathematical values, it is possible, Mr. Haskell said, to plot them geometrically, on a graph. This graph, which he calls a "coaction rose", is basically two straight lines at right angles to each other, like the



FOR CHILD CANCER VICTIMS—The proposed Children's Wing at Memorial Cancer Center, New York City, as shown above in three-dimensional drawing, is part of the expansion program planned by Memorial Cancer Center. John D. Rockefeller, Jr., has pledged a donation of \$2,000,000 toward the \$5,250,000 construction and teaching program, contingent upon the raising of a matching sum by the Center.

four quarters of a mariner's compass. On it he plots the interactions (coactions) of various scientific principles.

This kind of analysis, Mr. Haskell said, shows that such sciences as genetics, systematic biology, and sociology naturally fall into classifications comparable to the periodic table of chemistry.

"It is likely that today, in 1949, we stand before a development of biology and social science comparable to that of chemistry in and after 1869, the year Dmitri Mendeleyev invented, or discovered, the natural classification of the chemical elements," he said.

He pointed out that the "mathematization" of conventional scientific terms is unifying scientific theories today in much the same way that the mathematical equations of Clerk Maxwell, the 19th century British physicist, unified the sciences of light, magnetism, and electricity.

Mr. Haskell is chairman of the organizing committee of the Council for Unified Research and Experimentation. His lecture, entitled "The Emergence of Unified Science, (The Appearance of Mendeleyev's Periodic Law in Genetics, Systematic Biology, and Sociology)," was given under the auspices of the Foundation for Integrated Education.

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HORTICULTURE

Scientist To Spend 92nd Birthday in African Jungle

► **LIBERTY** Hyde Bailey, the greatest authority on palm trees, garden plants and blackberry bushes in the world, will spend his 92nd birthday next March while on an expedition in the jungles of Africa. He plans to bring back with him rare specimens of palms to add to the collection of 150,000 plants in the Bailey Hortorium at Cornell University. "Hortorium" was a new word, manufactured by Dr. Bailey, which he felt more accurately described his collection than "herbarium."

Long and sometimes dangerous plant collecting trips are no novelty to the still

vigorous horticulturist. He spent his 90th birthday alone on an island in the Caribbean, his 89th somewhere up the Amazon River in Brazil.

Dr. Bailey plans to take off by plane sometime next month for Africa, and he'll probably go alone. As to just how he proceeds after he gets there, he doesn't know. "I can organize the trip after I get there," he said. "There is no rush."

Officials at the Bailey Hortorium aren't worried about his lack of plans, however. Dr. Bailey has traveled 250,000 miles in his long lifetime and he has collected 275,000 plant specimens.

In addition to his travels all over this country, in South America, China and New Zealand, Dr. Bailey has found time to be the pioneer of modern agricultural educational methods, to edit 156 books about plants, to edit a magazine and to engage in plant breeding and experimentation. He accomplished all this because at an early age he planned his own life program: 25 years of study, 25 years of teaching and 25 years to do whatever interested him most.

Now well into his fourth 25-year hitch Dr. Bailey is still enjoying himself, still traveling and still collecting plants.

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GENERAL SCIENCE

Eva the Engineer Must Remember To Be Eve

► **EVA** the Engineer will do all right in such a masculine profession as engineering if she remembers to be Eve first of all and an engineer secondly.

This advice comes from a woman who apparently has followed it herself and avoided lonely spinsterhood and being thought "a little queer." She is Mrs. Florence F. Buckland, heat transfer and fluid flow consultant in the General Electric Engineering and Consulting Laboratory.

She also advised teachers and textbook writers to take the feminine viewpoint, remembering that "electricity, heat and op-

tics might be explained in terms of sewing machine motors, cooking and moonlight" and that the properties of matter apply to a cake of soap as well as to a chunk of iron.

Mrs. Buckland's ideas on engineering as a career for women were presented at the meeting in New York of the American Society of Mechanical Engineers.

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Chromium, essential in stainless steel and widely used in other applications, is largely imported, the United States producing only about 1% of what it uses.

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Photographs: Cover, Mt. Wilson and Palomar Observatories; p. 403, Memorial Cancer Center; p. 405, USAF Air Materiel Command; p. 406, Smithsonian Institution; p. 407, American Museum of Natural History; p. 408, Paul H. Donaldson; p. 409, Max F. Colin, Armaur and Co; p. 410, U. S. Army.

GENERAL SCIENCE

Science Review for 1949

Russia's atomic explosion, cortisone and ACTH for arthritis treatment and giant accelerators are among the top science highlights of the year.

This summary of the year's happenings in the world of science is limited by space to just the highlights. Most of the events are described in detail in the pages of SCIENCE NEWS LETTER for the current year. If you wish to refer to any particular report, you may find it readily through the index. (See SNL, June 25 and also the issue which will appear next week, Dec. 31).

By SCIENCE SERVICE STAFF

► THE atomic explosion in Russia, if it set the world stage for war, is the top research development of 1949, expected though it has been. Consequences of Soviet conquest of atomic energy may wreck our civilization and major scientific progress if the Russians use it for aggression. If, as claimed, they intend to use atomic explosions for peaceful engineering purposes only, then another explosion is unimportant.

Top achievements in health for the world are: Demonstration that cortisone and ACTH, glandular products, treat arthritis effectively and promise aid in other diseases, notably mental ills. Anti-allergy drugs, antagonistic to histamine, promise to relieve symptoms of colds—one of the great causes of human discomfort and loss of working time. Another related drug, dramamine, was found to relieve the discomfort of sea and air sickness and other nausea.

Jet and rocket developments for war and peace, although largely secret, probably lead the aviation research progress, but the non-stop circling of the globe by an Army plane is a reminder of our shrinking world.

Top chemical achievements are: progress in fluorocarbons which promise improved materials such as lubricants, and the synthesis of chloromycetin, first antibiotic to be so produced commercially.

Two classes of giant machines of the laboratory, accelerators and electronic computers, brought us closer to greater control over matter. The accelerators—cyclotrons and the like—are building and going into service to probe the very nature of matter and its fundamental particles. The giant "electronic brains" are starting to solve a variety of problems including flight of guided missiles and use of other weapons as well as industrial and scientific developments.

Evidences of men in Alaska older than any previously found in America and contemporaneous with the Cro-Magnon in Europe were unearthed and added to our pre-history.

There was increasing research on capturing the energy of the sunshine, with one tack the use of algae and yeast to produce food and chemicals and the other fundamental investigation of the process of photosynthesis in the plant in order to duplicate it in the factory.

AERONAUTICS

"Sky Compass" Is Useful In Polar Regions

A "sky compass," making use of polaroid and cellophane, and useful during twilight periods in polar regions, was developed.

An informal record was set by the airplane "Lucky Lady II" when it flew non-stop around the world in 94 hours and one minute, being refueled in the air.

Achievement in supersonic speed was recognized with award of the Collier Trophy to John Stack, research scientist of the N. A. C. A., Lawrence D. Bell, president of Bell Company, maker of supersonic plane, and Capt. Charles E. Yeager, pilot of the plane on its first supersonic flight.

The Delta-wing airplane, with radically different design of sweep-back wings, reached the test stage.

A slow plane that can land on a tennis court was developed.

A helicopter with ram-jet engines on the tips of its lifting rotary blades was under construction; one—"The Little Henry"—was flown.

A rocket motor utilizing liquid hydrogen for fuel and liquid oxygen as oxidizing agent was successful in experimental use.

Mid-air refueling was demonstrated to be practicable for commercial and military planes by a round-the-world non-stop flight and by a jet fighter which remained in the air for 12 hours.

Flight service in bad weather was facilitated by two new airport lighting systems, one using krypton lights, and the other with variable intensity lights regulated at request of incoming pilot.

The CAA-developed Instrument Landing System and the radar-radio system known as Ground Controlled Approach were approved as standards for world-wide use.

FIDO, the fog-dispersing system, was installed for the first time commercially, at Los Angeles Airport.

A stall-proof automatic pilot capable of flying in all sorts of weather and of making instrument landings was tested.

Wing-tip domes in bomb-like casings, called "radomes", for housing radar equipment and antennas, were successfully tested.

Cross-wind landing gear, which permits safe landings regardless of the direction of the wind, was certified for use with DC-3 planes.

An oxygen converter system was developed that permits the use of oxygen in liquid form for airplane crews and passengers.

A prone-position pilot bed to lessen flying

fatigue in a jet plane and prevent ill effects from acceleration was developed.

Location of new type radio antennas under the skin of airplanes, saved up to 600 horsepower for propulsion purposes in some of the larger planes.

A new wind tunnel for testing models of missiles, attained the highest recorded air velocity, ten times the speed of sound.

The world's largest supersonic wind tunnel, with test section measuring six by eight feet, and which will accommodate a full-scale jet engine under actual operating conditions, was put in operation and found capable of speeds up to twice that of sound.

A new type wind tunnel, a straight-through type with air current provided by a standard turbo-jet engine, was developed.

Two new guided missiles, No. 774 and NATIV, were fired successfully.

A program was started to recover instruments in rocket warheads by parachute.

"Flying boom" in-flight refueling system utilized telescoping pipe.

A Joint Long Range Proving Ground was established at Banana River, Fla.

Camp Forrest, Tenn., selected as site of an Air Engineering Development Center.

ANTHROPOLOGY-ARCHAEOLOGY

Stone Age Alaskan Linked With Cro-Magnon Man

Burins, evidence of an Old Stone Age culture similar to that of Cro-Magnon Man in Europe, were unearthed in Arctic Alaska in the dwelling sites of what were probably America's first inhabitants.

Additional evidence that the first Americans migrated from Asia were mesolithic stone implements like some previously found in the Gobi Desert.

Traces of habitation of some of America's



PILOT BED—H. T. Hertzberg, chief of the Anthropometric Unit, demonstrates the prone position pilot bed which eliminates flying fatigue common with the ordinary sitting position and increases tolerance of pilots to gravitational pull.

oldest inhabitants, Folsom Man, were unearthed in Virginia and northern North Carolina.

Evidence was found indicating that although Yuma man lived in America before Folsom man he continued throughout the Folsom period, making them contemporaries.

Metallographic study of ancient iron objects found in prehistoric sites in Virginia and Ohio provided evidence that iron may have been worked in America in pre-Columbian days.

An ancient "lost city" which had been a flourishing city of about 100,000 population at the time of the Crusades and is still remarkably well preserved, was found in the Seistan area of Afghanistan.

Man's earliest realistic portrait was found in the form of a 12,000-year-old stone work of art making use of painting, engraving and sculpture, discovered in a cave at Angles-sur-l'Anglin, France.

Newly discovered ape-men of South Africa were shown to have crushed baboon skulls caused by animal bones serving as clubs.

The buffalo grass growth on the Great Plains was due to the Indian custom of periodic burning off to keep the country open, it was reported.

Famous Piltown man, long considered one of mankind's oldest ancestors, was found to be no more than 10,000 years old instead of 100,000 to 500,000 as previously thought.

Early Stone Age tools found at the former sites of beaches in Portuguese East Africa gave information of ocean and sea level changes in the region.

Animals hunted by Old Stone Age man are portrayed by lines engraved on a large rounded pebble found in a rock shelter in eastern France.

A group of Indians, descendants of the Maya, were found to have lost nearly two inches in height in the course of two centuries.

Evidence of a gambling place used by pre-Columbian Indians was found near the California-Nevada boundary.

Ancient bone ax-heads believed to be prototypes for Neolithic man's stone ax-head were discovered on the west bank of the Nile.

Drawing of a whale hunt on a 500-year-old snow knife found in the Canadian Arctic provided evidence of a vanished people and of changes in ice conditions and altered ocean currents.

ASTRONOMY

Minor Planet Found To Pass Closest to Sun

A minor planet or asteroid was found to have a path which apparently takes it closer to the sun than any previously charted, promising to give important data for the studies of the solar system.

A second satellite of Neptune was discovered. Demonstration was made of the absence of a lunar eclipse effect when observations are made by radar in wavelengths of 1.25 cm., indicating that the moon is covered with a non-conducting layer of dust.

Discovery of bright line radiation in the spectra of objects previously identified as globular clusters showed that they are apparently Pleiades-like groups composed of stars and nebulosity in the Andromeda Nebula.

Dim stars broadcast to the earth a short-wave radio noise that was received with special antenna.

Construction was begun on a 50-foot radio mirror which will be used in connection with a sensitive radio receiver to pick up cosmic static.

Two cooperating institutions began a survey

of the brightest stars of the Milky Way up to a distance of 32,000 light years, photographing fields of stars through an objective prism used with the Schmidt telescope.

Great clouds of matter in the space between the stars are relatively uniform in composition, it was indicated by the uniformity of H and K spectrum lines of various stars.

Three novae were reported, one in the constellation Cetus and thought to be our second nearest star neighbor in space, another in Scorpius, and the third in Scutius; one discovered nine years ago was confirmed.

Twenty millionths of an inch of glass hampering the big glass eye of Palomar had to be polished away before the giant eye could have another try at probing the great unknown; the 48-inch Schmidt telescope helped to lay the groundwork for the 200-inch Hale telescope.

The giant, 98-inch glass mirror for the largest telescope in the world outside of the United States was presented to Britain's Royal Greenwich Observatory by the McGregor Fund of Detroit.

The Radcliffe 74-inch reflector at Pretoria, South Africa, started operation.

Purchase was made by Lick Observatory of a 120-inch glass blank for a new 120-inch reflecting telescope.

Six new comets were discovered.

Some clusters of stars in the Milky Way galaxy were reported to be disintegrating while others were becoming denser and more strongly clustered than ever.

Low-frequency radar was used to detect fast-moving meteors.

A photographic study of meteors was begun, showing as one of the first results that the density of the atmosphere 45 miles or so above the earth increases in summer and decreases in winter.

Yellowish lemon-shaped stars were reported to be possible planetary ancestors of other planetary systems.

A noisy zone millions of miles deep was advanced as the mechanism whereby giant red stars with intensely hot centers are able to exist.

A new electronic plate-measuring machine to

help discover what makes up the stars was announced.

The latest theory on the origin of the earth stated that the earth was once a pancake of gas and dust rotating around the sun.

The theory that comet heads were formed from the melting of various ices of common gases, starting in the outer reaches of the solar system and mixed with meteoric particles was proposed.

A photographic survey of the sky using the 48-inch wide-angled Schmidt telescope, of which the plates are to be utilized in the production of a sky atlas, was begun.

A "vacuum ultraviolet" emulsion useful for studying the sun from rockets sent high into our atmosphere was developed.

BIOLOGICAL SCIENCES

Algae Were Studied as a Substitute for Food

A freshwater alga, *Chlorella*, as well as yeasts and seaweed were studied as possible substitute foods for man and animals to avert future famines.

Fertilized ova from artificially inseminated pedigreed cows were successfully implanted in the bodies of scrub cows.

Virgin heifers and barren cows were induced to give milk by burying tablets of the synthetic female hormone diethylstilbestrol under their skins.

Treatment with a female sex hormone, stilbestrol, with iodinated casein or thyroxine, made pigs into bigger porkers on less feed.

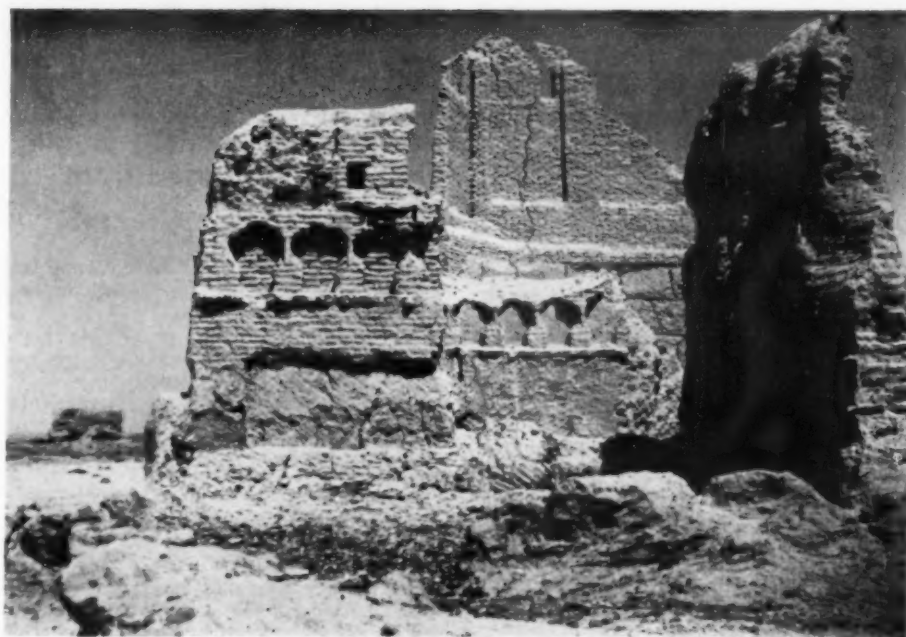
A blood group in dogs, which, like Rh in humans, may cause jaundice in the young through incompatibility with the mother, was found and named Do.

Early-stage embryos of mice with cells containing three times the basic number of chromosomes were obtained, the first ever reported in mammals.

The cause of swine enteritis, which produces runt pigs, was found to be deficiency of B



CLUE TO VANISHED PEOPLE—The drawing made on a snow knife shows five men in a typical Eskimo boat on a whale hunt. The drawing was made by an unknown artist some 500 years ago and points to the fact that once a vanished people lived on Cornwallis Island in the Canadian Arctic Archipelago.



CITY DISCOVERED—A "lost city" in the remote desert region of Afghanistan was found. The deserted city is believed by scientists to have flourished in the twelfth century.

vitamins; it was cured by vitamin injection.

A female sex hormone was found in fresh young spring grass, which may account for the larger milk yield of cows at that time of year.

Amino acids from urea can be produced in the rumen of cud-chewing animals, it was found.

A cheaper vaccine for the protection of livestock against foot-and-mouth disease was made by culturing the virus on the lining of the rumen.

Hornets were found to be useful in tracing radioactive leaks because of their trait of accumulating barium in their bodies; periodic killing and analysis of some of the insects reveals pollution of the plants of the neighborhood.

Proof was found that mosquitoes carry the virus of eastern equine encephalomyelitis.

An inbred strain of corn that produces no pollen was developed, making it possible to grow hybrid seed corn without the laborious and often injurious detasseling process.

Use of hormone sprays reduced the dropping of apples before harvest.

Coconut milk was found to contain a still-unidentified substance which stimulates plant growth.

The seaweed *Laminaria* produces a growth-control substance in much the same manner as higher plants, it was found.

High aroma, low nicotine "Turkish" type tobaccos have been successfully grown in the United States.

Carbon black was successfully used to raise soil temperature by increased heat absorption from the sun.

Uranium in the form of its nitrate salt was found to cause hereditary changes in widely different kinds of fungi.

Two new insecticides, benzene hexachloride and gammexane, or 666, were found to cause hereditary changes in plants through multiplying the number of chromosomes.

DFDT, apple-scented German cousin to DDT, was found to be a better killer of houseflies

than DDT and less toxic to warm-blooded animals and fish.

Pyrethrum was synthesized for insect sprays with more killing power than the natural product.

The aquatic plant pest, water hyacinth, can be controlled by spraying with 2,4-D, it was found.

DDT-resistant strains of flies were found to require 50 times the normal dose of DDT to kill them.

DDT resistant strains of flies and mosquitoes were found.

TCA was found to be effective in eradicating quack-grass and Johnson grass as well as prickly-pear cactus, but causes a temporary soil sterility.

Compound 42, chemical relative of dicoumarol, was found in field tests to be an effective rat killer, causing fatal abdominal bleeding.

Sudden reduction of osmotic pressure kills certain viruses by "osmotic shock," leaving them "ghosts," that is, empty head membranes with tails attached, it was found.

Actidione, antibiotic derived from the same fungus that produces streptomycin, was found effective against plant-disease fungi.

"Caesarian" operations saved valuable hybrid plant embryos, removing the immature embryos from abnormally developing seed capsules.

Micrografting was used to save valuable hybrid plants so weak they couldn't break through the seed-coat normally, attaching them to the stems of stronger, related plants and protecting them in a gelatine capsule.

The seed-pod of the cascalote tree of Mexico was found to rival the South American quebracho as a source of leather-tanning tannin and as an oil-drill lubricant.

A starch substitute for sizing textiles was found in a wild onion of India.

Seedless figs were produced in half the usual time, by dispensing with wasp pollination, and by spraying instead with the synthetic hormone, 2,4,5-T.

Plants with large, deep root systems, like corn, make less use of fertilizer phosphorus than

do plants with more limited root systems like potatoes, experiments with radioactive phosphorus showed.

Phony peach disease was found to be carried by four related species of leaf hoppers.

The elementary particles, or molecules, of cellulose, consisting of small equal-sized rods, were discovered with the aid of the electron microscope.

A new method of spreading chromosomes for photography under the electron microscope brought the genes one step nearer to positive identification.

A micro-analysis apparatus was developed which measures the minute quantities of various chemicals present in a cell nucleus.

The virus of mosaic disease in tobacco showed up as tight sheaves of needle-like particles in electron microscope photos.

New preparation techniques enabled biologists to study the nuclei and flagella of bacteria cells under the electron microscope.

The first international congress of biochemistry was held in August at Cambridge, England.

The giant African snail, a plant pest, was detected in 15 shipments at American ports, and was destroyed in all cases.

More flavorful fruit juices were made possible by development of a process for extraction through distillation of the "essence" of the fruit.

Elephant seals, once thought extinct, are increasing in numbers off the coast of Mexico.

Hutias, big rodents thought to be extinct, were found living in Haiti.

CHEMISTRY AND PHYSICS

New Atom Smashers Were Completed This Year

Several new atom smashers were completed or under construction during the year: among them a 6,000,000-electron-volt bevatron, model of larger machine planned; a 300,000,000-electron-volt synchrotron at the University of California; a 70,000,000-volt synchrotron at the U. of C. Medical School devoted to medical research; another 300,000,000-electron-volt non-ferro-magnetic synchrotron at General Electric Company; a 50,000,000-volt betatron for the National Bureau of Standards to develop standards for X-ray dosage; a 300,000,000-volt betatron for the University of Illinois; a 300,000,000-volt synchrotron for Purdue University; a 3,500,000-electron-volt electrostatic accelerator for Brookhaven National Laboratory; a baby 9,000,000-electron-volt betatron for Holland; and an "in-between" 125,000,000-electron-volt synchro-cyclotron for Harvard.

News was received in the United States of an atomic explosion in Russia.

An instrument for detecting air-borne contaminants was developed, consisting of a jet through which air samples are drawn and their particles deposited on a revolving glass disk.

Creation of mesons by radiation in the 300,000,000-electron-volt synchrotron was first direct evidence that these cosmic ray particles can be made from electromagnetic radiation, as well as by high-speed alpha particles.

Immense explosive showers of atomic fragments a mile across, each thought to be caused by a single atomic bullet from outer space, were discovered in the earth's atmosphere.

Nearly a third of the total mass of the projectiles in the cosmic rays from outer space consist of hearts of heavy atoms ranging from carbon to molybdenum, stripped of their electrons.

Superballoons of welded polyethylene plastic

were developed to carry scientific apparatus weighing as much as two men to new heights above the earth.

A new magnetic iron-nickel alloy, Orthonol, proved superior for use in magnetic amplifiers instead of the delicate electronic tube.

A method for making shadow photographs under the electron microscope of the direction and strength of the fields of minute "atomic magnets" within magnetic materials provided a new tool for fundamental research in physics.

The idea was proposed that space between the stars may be filled with tiny, magnetic needles of iron in giant magnetic fields.

Radio microwaves were used to find the dimensions and spin-rate of certain molecules in gases by the absorption of the rays passed through the gas.

Zirconium was found to be suitable as a structural material for building atomic energy piles.

Small-lot production of titanium metal was applied commercially.

A ten-minute warning that an atomic bomb will drop can reduce the casualties of a normal city ready for atomic attack from 100,000 to 10,000, it was estimated.

A new atomic particle, the negative proton, was predicted.

The Nobel Prize in physics was awarded to Dr. Hideki Yukawa who predicted the existence of the meson three years before it was found in experiments with cosmic rays.

Platinum with mass 190 was discovered and two other stable isotopes were predicted: tellurium 118, gadolinium 150.

A polarizer for infra-red rays in sheet form was invented.

A supermicroscope that "sees" with mirrors made possible use of infra-red rays for spectral analysis and identification of chemicals; plans were made for the manufacture of this instrument in the United States.

A radiation detector for disaster use in bombed areas where amount of radiation would swamp a Geiger counter was put into commercial production.

An atomic clock which tells time by the movements of atoms in molecules of ammonia was put in action.

A new theoretical approach was proposed for reconciling the relativity theory of Einstein with quantum mechanics, emphasizing position in the case of macroscopic worlds and velocity inside the atom.

The "scintillation counter" is a new device developed for detecting radioactive radiations.

Soft X-rays were found in the upper atmosphere by V-2 rocket exploration and believed responsible for the ionosphere.

Radioactive elements do not speed plant growth, it was established.

Methods of disposing of dangerous atomic wastes by having bacteria absorb them and by incorporating them in concrete were developed.

New use was found for the atomic furnace, or chain-reacting neutron pile, in measuring the amount of chemical element in an unknown material through the activity induced.

New semiconductors were produced by irradiation of germanium in the atomic pile with slow neutrons, thus creating a predictable number of impurity centers in the material itself.

An ultraviolet microscope was developed which makes photographs in color, making possible contrast effects without the use of chemical stains.

A new technique was developed for thin slicing for preparations for the electron microscope which makes slices so thin that 4,000 would be only the thickness of a human hair.

Several theories were advanced to account for

the birth of cosmic rays: one that great clouds of dust in interstellar space create magnetic fields in which a particle may gain energy; another that the energy comes from tremendous explosions of supernovae.

Molten zirconium at a temperature near 6,500 degrees Fahrenheit provides the light in a new lamp developed for use in photography, projection and television.

The Neg'ator, a mechanical spring that resists less the more it is deformed, was developed.

A new method of taking photographs by use of a screen coated with specially prepared phosphors, and called thermo-radiography, was developed.

Better synthetic rubbers were produced which are resistant to extreme heat and Arctic cold and which will not deform materially under the weight of vibrating machines.

By international agreement, the name of the element tungsten was changed to wolfram, columbium to niobium, and agreement was reached on what to call other elements going by different names in different countries.

An unexpected source of chemical energy was found present in the atomic piles when potassium chloride was changed to potassium sulfate, a highly oxidized material capable of reducing other substances.

New facilities for the production of plutonium were put into operation at Hanford, Wash.

A new method of making acetylene from methane, making use of electric current, was announced.

Quartz crystals produced synthetically were found to be better than the natural ones.

The all-synthetic fiber, dynel, the short staple form of vinyon, was announced.

Orlon, a new synthetic yarn from natural gas, oxygen and nitrogen from the atmosphere was developed and found to be resistant to sunlight, moisture, fungus and insects.

A new process was developed for making metal films, so thin that they can be used as supporting membranes for electron microscopic studies.

Crystals of calcium tungstate were made synthetically in water-white pure form.

The Nobel Prize in chemistry was awarded to Dr. William F. Giauque, world pioneer in low temperature research.

New detergents called morpholinium alkyl sulfates which not only cleanse but kill germs were produced.

Higher gasoline yields, lower butane and gas yields, and somewhat lower gasoline octane numbers were obtained with silica-magnesia cracking catalyst.

A wool-like synthetic fiber was made from cottonseed protein.

Thermoluminescence was found to be a sensitive test for radioactivity in rocks of the earth.

It was made possible to re-use photographic wash water over and over by a water purification method using ion exchange.

Starch was converted into sugar by polarized infra-red light.

A new lubricant of unprecedented stability and a chemically inert plastic were applications made of a new family of organic chemical compounds, the fluorocarbons.

Synthetic seaweed fibers were used to weave light delicate fabrics from which the seaweed-like fibers are removed by washing out.

An isotope of nitrogen with mass 12 was discovered by bombarding carbon with high energy protons from a linear accelerator.

Spectrographic study revealed in the upper atmosphere two kinds of carbon dioxide; one composed of two atoms of oxygen to one of heavy carbon; the other composed of one atom

of ordinary carbon to one of ordinary oxygen and one of heavy oxygen.

Infra-red studies revealed that long heat waves can pass blocks of purest germanium of considerable thickness.

EARTH SCIENCES

Fuel Was Obtained from Unmined Coal

A process was developed for obtaining fuel gases from unmined coal by sending an electric current through it.

A one-step method for getting high-grade gasoline from low-grade crude oil without use of high pressure was devised.

The theory that the earth's magnetic field may be due to the gravity pull of the earth as it spins on its axis was advanced.

A one-pound Geiger counter was developed in Canada for uranium prospecting.

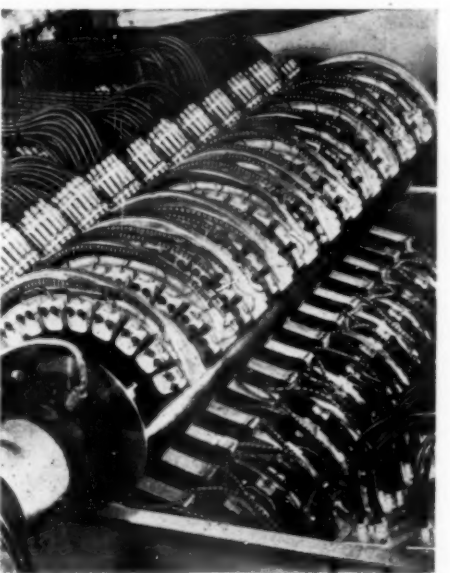
An industrial seismograph was devised; it is about the size of a box camera and used to measure vibration in machinery.

In carefully controlled experiments to produce precipitation by seeding cumulus type clouds with dry ice, the most obvious result was dissipation rather than rain-producing development.

A new cloud analyzer which measures the height of a cloud at its summit as well as at its base and indicates the density, was developed.

Fossils of three different races of ape-men were found in South Africa; one of giants two and one-half times as big as today's average human being; another a race of small, gracefully built ape-men weighing about 100 pounds each; and a third type more nearly human than some of those previously found.

Measurement of the heavy oxygen present in fossils from upper Cretaceous chalk deposits of England and comparison with that in the sea water showed that a hundred million years



HARVARD MARK III—The magnetic drum memory organ of this computer has many pick-up heads and wires that are the electric nerves leading in to the rest of the computer.



ACTH SOURCE—The pituitary gland from which ACTH is made is encased in a bony structure at the base of the hog's skull. To remove the gland which is the size of a grain of corn, the operator uses a power-driven knife to split the skull. The indentation in the knife avoids injuring the pituitary or the brain.

ago the ocean off western Europe was warmer than it is now.

Discovery of fossils of ancient shark spines in South America set back the estimated age of rock formations by 100,000,000 years.

Skeleton of a 150,000,000-year old phyto-saur, crocodile-like animal, was found.

Fossils, 75,000,000 years old, of ancient animal life five or more times the usual size were found in Mississippi.

Radioactive carbon was found to be effective in measuring the age of anything that has been alive within the past 20,000 to 25,000 years.

A "blister" hypothesis of mountain formation suggested that slow-working atomic energy pushed up the earth's crust.

The Hawaiian volcano Mauna Loa erupted unexpectedly but harmlessly.

There were 120 earthquakes of sufficient strength to record themselves on seismographs so they could be immediately located; one in Ecuador was extremely destructive to life and property and other destructive quakes occurred in Chile and Washington, the latter being the worst quake in the history of the Pacific Northwest.

A new scientific organization, the American Geological Institute, was formed.

Using samples of air collected by V-2 rockets, it was determined that the composition of air 42 miles above the earth is the same as that at the surface.

The Atlantic ocean bottom was determined to be about 500,000,000 years old, more than seven times older than previous estimates.

The earth's magnetic field was revealed to have remained practically the same for at least 100,000,000 years.

ENGINEERING AND TECHNOLOGY

A Rubber Road Surface Underwent Tests

A road surface of powdered natural rubber in asphalt was tested.

Plastic foam, the world's lightest solid, made by heating a molasses-like synthetic resin, was developed for heat insulating.

A new synthetic fiber, a metal-carboxy-methyl-cellulose from wood or cotton, was developed for textile use.

America's first gas turbine-electric locomotive entered actual railroad service.

Cheap softwoods were made into hardwood by a heat-pressure process utilizing the natural lignin in the wood as the cementing agent.

The magnetic fluid clutch found application in a new servo-mechanism used for power steering of airplanes and other mechanisms.

New developments in electronic computers were the application of the electronic brains to problems of present day civilization ranging from economics to supersonic flight; a faster smaller computer for office work; a computer featuring a "memory system" capable of storing 64,000 digits; and a machine capable of playing chess which helped in solution of engineering problems.

UNIVAC, an electronic computing machine, could be utilized as a fail-safe librarian machine with "probability coding", it was reported.

A high-speed camera made pictures in one twenty-millionth of a second by the use of high voltage passed through the electrodes of a cell which in conjunction with polarized light acted as an electrical shutter.

A heat treatment gave quartz crystals, essential in radio and television, a long life without deterioration.

A rotating carbon disk replaced the conventional negative rod in a new type of arc lamp which gives greater life and brilliancy.

High-quality coke briquettes and gases that could be converted into gasoline and diesel oil were produced from non-coking coal by a new electrical process.

Cotton and rayon fabrics were flame-proofed by treatment with a chemical solution of titanium and antimony salts.

Only five seconds were required to temper a metal surface by an electronic heating process.

A silica substance which acts as a nearly perfect diffuser of light gave promise of replacing the inside-frosted electric incandescent bulb.

The soybean yielded a tight-sticking glue called Gelsol which can also be used for food.

Quartz crystals which produce "silent" sound waves were utilized in a new laboratory ultrasonic generator.

Plastics which are good insulators were made into effective conductors of electricity.

Air-cooling of motion picture films in use resulted in higher screen illumination.

Television reception was improved by the new television carrier synchronization method which eliminates frequency difference.

Higher power for radio broadcasting was obtained by a system which combined two transmitters with one diplexer to form a single unit.

Long-range radio transmission was aided by the discovery that the ionospheric characteristics at any point on the earth are almost identical with those at a point on the other side of the earth directly opposite.

A radioactive barium isotope was used as a tracer to show the progress of oil as it traveled through hundreds of miles of pipeline.

New high voltage rectifier tubes with thorium-

tungsten filaments which are used in X-ray equipment promised a service life 50 times that of the ordinary rectifier tube.

Television receivers in the mid-West were able to pick up programs on the Atlantic Coast by means of coaxial cable and relays.

A bright reflective finish was given to metals without mechanical polishing by merely dipping in a mixture of acids, operated at ordinary room temperature and up to 200 degrees Fahrenheit.

New developments in television were: an all-electronic system of color television in which three primary colors are sent and received on the television scope at the same time; a television receiver which will pick up color broadcasting of all proposed systems and also the present black-and-white broadcasting programs.

MEDICAL SCIENCES

Cortisone and ACTH Gave Relief to Arthritics

The synthetic adrenal gland hormone, cortisone, and an adrenal cortex stimulating hormone from the pituitary gland, ACTH, brought dramatic relief to sufferers from rheumatoid arthritis, showed promise in rheumatic fever; allergies and drug sensitivities; the muscle weakness condition, myasthenia gravis; certain cancerous diseases affecting lymph glands; aging processes involving collagen tissues of the body; but extreme scarcity restricts use of these hormones until new raw materials or synthetic processes can be developed.

Discovery of a new blood separation technique in which fibrinogen, a blood-clotting factor, is added to the blood made possible large scale, fast separation of red and white blood cells and blood platelets from each other and from the liquid part of the blood.

Dramamine, a new anti-allergy drug, was found to give relief from motion sickness, radiation sickness, migraine headaches, nausea following electric shock treatments, and nausea and vomiting in expectant mothers, but pilots were cautioned about its sleep-inducing effect.

Synthesizing of chloromycetin marked the first time in history that disease-curing mold chemical, or antibiotic drug, had been synthesized on a practical basis.

Aureomycin, mold remedy which can be given by mouth, has been reported effective against amebic dysentery, shingles, pemphigus, whooping cough, undulant fever acquired from goats, and is being tried against syphilis.

A new antibiotic cousin of streptomycin, christened neomycin, was discovered which is active against tuberculosis germs not checked by the former drug.

Pills containing anti-histamine compounds to ward off colds were released for sale over the counter without prescription.

Lead to chemical treatment of leukemia and other cancerous conditions was discovered in folic acid vitamin antagonists among which are Aminopterin, An-Fol-A, and Amino-An-Fol.

A method was developed for large scale preparation of the "master substance of muscle," adenosine triphosphate, believed potentially valuable in conditions of dysfunction of muscles, particularly heart and artery muscles.

A chemical found in the nuclei of cells, desoxyribonucleic acid, was shown positively to be a constituent of genes.

Pearly white opalescence of blood within 24 hours after exposure to radiation was found to be a sign of impending death in rabbits and may be applicable to humans.

Dry silverpermanganate coated upon a suit-

able carrier was found to prevent carbon monoxide poisoning.

A new type of high blood pressure disease, for which the name Schroeder's syndrome was suggested, and a sweat salt test for detecting it were discovered.

Method for producing amino acids for vein feeding cheaply on a mass scale was developed.

Accidental jaundice infection from the blood of donors was established as a new compensable occupational hazard for technicians or blood bank workers.

Evidence that sickle cell anemia may be the world's first molecular disease was presented.

Zirconium proved an antidote for plutonium poisoning in experiments with rats.

Rat experiments revealed that lithium chloride, salt substitute, causes death by its inhibitory effect on the breakdown of glucose to lactic acid.

Lead fibreglas clothing was developed as protection against radiation.

Tests of a new vitamin, called B₁₄, isolated from human kidney excretions, showed its ability to check reproduction of cancer cells but increase production of red blood cells in bone marrow.

Promise of safer blood and plasma transfusions followed the discovery that nitrogen mustard gas destroyed the jaundice virus.

Directing high-energy particles produced by the cyclotron into the center of a cancerous mass well below the skin in mice fulfilled hope that greater ionization and cancer tissue-destroying effect would result.

Animal experiments led to the first discovery that a chemical in cancer cells is responsible for disturbance of a generalized metabolic function in the thyroid gland.

First use of the atom-smashing betatron in the treatment of a human cancer patient was announced.

New tests for detecting cancer were: looking for anti-enzyme activity of the blood; comparing the clotting rate of heated blood to which iodoacetic acid has been added with that of normal blood; detecting electrical differences between cancer tissue and normal tissue.

New factor discovered in human blood, which endangers infants when their mothers lack it, has been named Cellano factor after the woman who was found without it.

Isolation of a virus which produces symptoms similar to the non-paralyzing form of polio was announced.

A new vitamin factor, called biocytin, was isolated from yeast.

Seasonal factors in growth were demonstrated in a study of muscular strength; gains in weight tend to be greater in the fall, but gains in height, skeletal maturity and strength are greater in the spring.

The Nobel peace prize was awarded to Lord Boyd Orr, Scottish nutrition authority.

The Nobel Prize in medicine was awarded to Dr. Egas Moniz, who discovered the sanity-restoring brain operation, and Dr. Rudolph Walter Hess, for his discovery of the role of the brain stem in inducing sleep.

PSYCHIATRY AND PSYCHOLOGY

Psychiatry Taught to Hospital Attendants

A new school was organized to teach psychiatry to mental hospital attendants.

Roland J. Brand, attendant at the Milwaukee, Wis., County Asylum was given a new award, "Psychiatric Aide of the Year."

Histamine was found to be effective in treat-

ment of the mentally ill, alone or in combination with electric shock.

Failure of the adrenal glands to respond to stimulation by ACTH from the pituitary was found to lead to inadequacy of the stress-response mechanism; this may be a factor in the production of schizophrenia.

Good results were reported in the trial of electroshock treatment for prevention of a return of mental illness in recovered patients.

Death rate from cancer is lower among mental patients than in the general population, it was found, incidence of hay fever is also less.

The \$1,500 Lester N. Hofheimer Research award for outstanding accomplishment in the field of psychiatry and mental hygiene was awarded to Dr. Benjamin Pasamanik for his study demonstrating the role of environmental factors on mental development.

A link was found between the alpha rhythm brain waves and voluntary muscular movements; action tends to take place at the time of the peak of the alpha rhythm.

Kappa brain waves—those electric signals from the brain itself that are associated with thinking—are most active when you are recalling imperfectly learned material and come in bursts as the solution of a problem is found.

In general, pain shows up in brain waves as a decrease in amplitude, it was found.

The newly founded American Academy for Cerebral Palsy inaugurated a brain registry where brains were accepted for neuropathological studies of cerebral palsy.

On the basis of animal experimentation, regressions and fixations were explained as resulting from early learning too strongly stamped in by excessive motivation or frustration, believed also to account for unreasonable hatred of outsiders.

Definite and substantial relation was found between an individual's regard for himself and his prejudice against others; both could be altered by psychotherapy.

In many cases crime has its roots in bicker-

ing, nagging and other forms of tension in the home, psychological study of the families of juvenile delinquents and criminals revealed.

On the average infantile paralysis does not leave pronounced after effects on the nervous habits or behavior of child patients, it was observed.

Children highly prejudiced against foreigners or minority groups tend to have a biased or distorted memory of things that happen and of stories read to them, it was found.

First study was completed in 10-year program of research on effects of different kinds of groups on the way people act; it was found the highest production occurs when the individuals feel identified with their work.

Failure of the pre-election polls in the fall of 1948 was found to be due to failure to improve techniques to keep step with advances in psychological science.

The ear was found to have an automatic means of reducing its sensitivity to noise made by the same animal.

A temporary loss of sensitivity to sound was found to occur during exposure to sound at all intensities.

A ten-year systematic investigation of the growth of visual functions in relations to the total make-up of infant and child was completed, defining a new field of developmental optics.

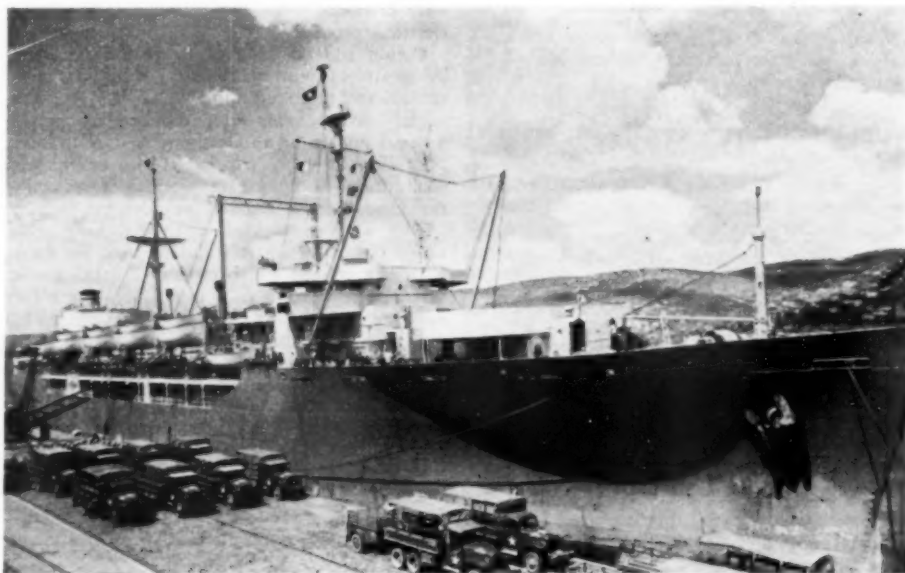
The most sensitive index point in the center of the eye was mapped and measured accurately for the first time.

Glutamic acid helped some children with mongoloid mental deficiency to improve in intelligence.

If a nursing mother's diet lacks thiamine, her baby may later be sub-normal in ability to learn, experiments with rats disclosed.

Techniques developed for the selection of men for hazardous behind-enemy lines work during the war were applied to research on the personality factors that lead to unusual success in living.

Science News Letter, December 24, 1949



"OPERATION SEASICKNESS"—Dramamine was under investigation on the voyage of the U. S. Army Transport General C. C. Ballou across the North Atlantic between Nov. 27 and Dec. 7, 1948. The Ballou was carrying 1,366 replacement troops en route from New York to Bremerhaven, Germany, on this extremely rough crossing which provided ideal conditions for a controlled study of motion sickness at sea.

GENERAL SCIENCE

Ten Top Science Advances

► THE ten most important science advances made during 1949, as picked by Watson Davis, director of Science Service, are:

1. Atomic explosion in Russia.
2. Hormones, cortisone and ACTH brought dramatic relief to sufferers from arthritis and promise to be useful in muscle weakness, kinds of cancer, aging disabilities and even mental illnesses.
3. Use of anti-allergy drugs to relieve the symptoms of colds.
4. Demonstration that dramamine relieves air and sea sickness and other nausea.
5. Non-stop round-the-world flight of

Army bomber in 94 hours.

6. Development of guided missiles, although details are still secret.

7. Commercial synthesis of chloromycetin, antibiotic for disease-fighting, first chemical manufacture of such material.

8. Discovery of Stone Age man in Alaska, giving man a greater antiquity in America.

9. Development of fluorocarbons as a new and promising class of chemicals, useful particularly as lubricants.

10. Discovery that lenses transmitting infra-red (heat) can be made from germanium metal opaque to ordinary light.

Science News Letter, December 24, 1949

MEDICINE

Convulsions from Malaria

► EPILEPTIC convulsions and "explosive behavior" are showing up in World War II veterans who had severe tropical malaria during their war service overseas.

Because vigorous anti-malaria treatment with quinine and newer drugs can rout the malaria germs before they do further damage to the brain, doctors should be on the alert to the possibility of malaria as a cause of convulsions among former service men, three physicians warn in the forthcoming issue of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Dec. 17) in Chicago, Ill. The physicians are Drs. David R. Talbot, Alan C. Elerding and John O. Westwater of Wadsworth General Hospital, U. S. Veterans' Administration Center, Los Angeles.

Examples of "explosive behavior" in a

23-year-old Marine veteran of Guadalcanal given in the medical report are: "manhandling his sister, threatening his father with a gun, forging a check and armed robbery of his uncle."

"At such times the patient felt 'forced' to do these things," the doctors report. "Later he would realize such actions were wrong and would surrender to authorities. There was only partial memory of these events."

Brain wave diagnosis may be valuable, the doctors state, for proper diagnosis of the condition. When the trouble is due to the severe tropical type of recurrent malaria, treatment of the malaria is of primary importance. Use of anti-epilepsy or anti-convulsive drugs must play a secondary role.

Science News Letter, December 24, 1949

AGRICULTURE

Aromatic Strawberries Are on the Way

► IF THEY could, Department of Agriculture scientists would develop strawberries complete with sugar and cream. Short of this, they are doing everything humanly possible to tickle the American palate.

Their latest gustatory masterpiece is a strawberry with a mouth-watering aroma, in addition to all the other tasty qualities which have earned the strawberry its princely place on the family table. It is not yet available commercially, but preliminary tests clearly indicate that the banana split will be hard-pressed for its favored position at the soda fountain.

An aromatic strawberry has been a long-standing ambition of Dr. George Darrow of the Beltsville, Md., Research Center. But it has not been easy. Patience, ingenuity and a poisonous drug have been a large

part of the story.

Working with Drs. Haig Dermen and Don Scott, Dr. Darrow started out with a European strawberry that is aromatic. The initial problem was to combine its sweet-smelling quality into the American garden varieties. Unfortunately, the hybrid was sterile, producing no seeds. This was almost 15 years ago.

At this point the poisonous drug, colchicine, was applied. Colchicine is the chemical that became famous for its ability to multiply the number of chromosomes, the units in the plant cell that govern heredity. As early as 1937 Dr. Dermen successfully used colchicine to double the chromosomes of the European berry. Although this "tetraploid" European berry was patiently crossed in every imaginable way with the American variety, it was not until now that it produced fertile hybrids. It is this hybrid, with aroma from its European parent and size and taste qualities from its American parent, that

Dr. Darrow thinks may have commercial possibilities.

However, it may be some years before this strawberry is on the market. Now it is the task of Dr. Darrow and his colleagues to breed other necessary characters into his aromatic berry. Most important of these are, resistance to root rot and leaf spot, firmness for shipping, and adaptation to the extreme South where strawberries are extensively grown.

All this will take time. Once all these characters are bred in, a matter of years, it will take another three years to make the runner plants available in quantity to commercial growers.

Science News Letter, December 24, 1949

ZOOLOGY

Tropical Jumping Spiders Jump to Attract Mate

► WHAT makes jumping spiders jump? The answer, in two carefully chosen words, is, That depends.

It depends for one thing on which way the wind is blowing, and for another thing, on how far along the evolutionary scale the particular species has come.

Jumping spiders, like certain other insects, birds, and other animals, go through characteristic gyrations, dances, and sundry other forms of showing off, presumably to attract a mate. Dr. Jocelyn Crane of the Tropical Research Department, New York Zoological Society, has come up with some new conclusions after studying the near tropical jumping spiders of Venezuela.

Although the sight of another spider usually sets off the courtship dance, Dr. Crane finds that chemicals borne by the air will also precipitate a spider jig. The more primitive the species, the more important the chemical stimulus.

Frequently a male spider will start showing off as soon as he spies another spider, male or female. When two males discover that they have been wasting their fanciest footwork on a rival, they promptly cut out the nonsense and rush at each other in mortal combat. This is true of relatively backward types; the more advanced species of jumping spider have worked out a code of etiquette for this situation, involving a ceremonial inter-male display.

Dr. Crane's paper on courtship and threat displays among jumping spiders was awarded honorable mention in the A. Cressy Morrison Prize Competition for 1949, announced at the annual meeting of the New York Academy of Sciences. The prize-winners of \$200 each were Abraham Slavin for "Stability Studies of Structural Frames", and Harold R. Hagan for "Embryology of the Viviparous Insects."

Science News Letter, December 24, 1949

Water emulsion paints are growing in popularity for home use; they are modest in cost, easy to apply, dry quickly and are free of objectionable odors.

GENERAL SCIENCE

Fellowship Controversy

► **CONTROVERSY** over FBI clearance has caused the virtual abandonment of any new fellowship program of the Atomic Energy Commission so far as it applies to non-secret research and study by those who have not obtained graduate degrees.

The National Academy of Sciences and its National Research Council refused to administer the non-secret fellowship program since Congress voted last summer to require that applicants be investigated by the FBI and pronounced loyal to the AEC.

A predoctoral program will be carried out only for non-secret work by present fellows who want their fellowships renewed, but in these cases the FBI clearance will be obtained before renewal. The National Research Council will pass only on the scientific attainments of the students and leave the loyalty matters to the AEC.

One of the hottest controversies in the history of the National Academy resulted from the proposed FBI clearances, which

were discussed at the Rochester, N. Y., meeting in October.

There was no difference of opinion as to desirability of FBI and security clearance for those whose advanced training will take them into secret fields. The National Research Council will administer a program of such fellowships for those who have the Ph.D. and full loyalty procedures have been agreed upon.

Next year's program will include about 250 awards, 175 of them renewals, while there are now 421 AEC fellows.

The Academy, top science body of the United States, urged the AEC to attempt to get Congress to eliminate the FBI checks from future legislation. The AEC was advised to see that prospective fellows are told the nature of FBI investigations and the criteria by which decisions are made by the AEC.

Science News Letter, December 24, 1949

MEDICINE

A-Bomb Causes Blindness

► **IF** another atom bomb ever drops, some of the survivors will go blind a year or two afterwards. The number likely to be blinded by the bomb may be one out of every 40 or 50 of those within a thousand yards of the bomb burst.

This may be predicted from a report by Drs. David G. Cogan, S. Forrest Martin and Samuel J. Kimura of Harvard Medical School, Boston, and the University of California Medical School, San Francisco, to the journal, *SCIENCE* (Dec. 16), in Washington, D. C.

These scientists are surveying atom bomb eye damage in Japan for the U. S. Atomic Bomb Casualty Commission. The survey was prompted in part by the discovery a year ago of cataracts in cyclotron workers in the United States.

The atom bomb blindness seen so far in 10 Japanese survivors is due to cataracts. Whether these were caused by neutrons or by gamma rays from the bomb is not known.

Among the 11 atom-smashing cyclotron workers whose eyes were damaged, neutrons seem the most likely cause of the damage, though this is not yet proved. Of 10 of the 11 cyclotron workers with eye damage, studied at the Wilmer Ophthalmological Institute of Johns Hopkins Hospital, Baltimore, three men have a severe handicap. Four are afflicted to a degree which does not at present interfere markedly with daily life. The other three have a minimal affliction which does not cause appreciable handicap.

The outlook is good for successful removal of the cataracts, with restoration of eyesight, in the severe cases. In two, this has already been accomplished, Drs. P. H. Abelson and P. G. Kruger of the Carnegie Institution of Washington and the University of Illinois state in their report in the same issue of *SCIENCE* on the cyclotron cataracts.

Science News Letter, December 24, 1949

AGRICULTURE

Silent Pop Sorghum May Soon Rival Popcorn

► **POPCORN** may soon have a rival: pop sorghum which can be chewed noiselessly, without getting caught in the teeth, is vying to become the number one movie confection.

Although sorghum grains make a smaller puff than popcorn, their thinner hull leaves no husk to lodge between the teeth. Pop sorghum is more tender in consequence and when chewed produces no crackling sounds to detract from the sound track.

Such at least are the claims made for pop sorghum by plant breeders of the Texas Agriculture Experiment Station who have developed what they think may some day rival popcorn for the public's favor.

The idea of popping sorghum is not new. At least 50 years ago farm boys were taking the grains of sorghum, raised extensively for cattle fodder, and roasting them over open fires. The Chinese make a confection

of sorghum by puffing it with steam, something like puffed rice.

Science News Letter, December 24, 1949

AERONAUTICS

1949 Airlines Death Rate Is Lowest in History

► **AMERICA** has had the lowest fatality rate in history of domestic and international flying by the scheduled carriers, the New Orleans Association of Commerce was told by D. W. Rentzel, U. S. Administrator of Civil Aeronautics, in New Orleans, La.

The trend in aviation during the year has been upward in every respect for air carriers, he said, but spotty for personal flying. Light-plane output is not keeping up with the number of old planes being scrapped. Private aircraft ownership is highest in sparsely populated states, which have a high proportion of airports to population and a high percentage of good flying weather.

A new undertaking of the CAA, he reported, is assistance in the development of fast roads to airports from the cities they serve. It is advisory assistance to local officials. Too often, he stated, the time-saving of air travel is cancelled by the delays in getting to and from airports.

Science News Letter, December 24, 1949

GENERAL SCIENCE

Prescription for Stable World Is Given

► **FOUR** things are needed to make a "stable scientific society," in other words, a world free from war, famine and other disasters, Bertrand Russell, English philosopher, declared at the meeting of the Royal Society of Medicine in London.

But in his view the prospects are gloomy for a world governed by science being stable.

The four requirements, he said, are: 1. One single world government with arms monopoly for enforcing peace. 2. General diffusion of prosperity. 3. Low birth rate everywhere to stop the present disastrous population increase. 4. Provisions for individual initiative and expression.

The unlikelihood of achieving these four requirements in the near future means we face the prospect of war, famine and pestilence, he declared. But he believes that ultimately world government may achieve these aims.

Russia, China and India are today, he said, the great reservoirs of procreation and poverty.

Science News Letter, December 24, 1949

Considerable damage has been done to turf within a radius of 20 miles of New York City during the past two years by the *Japanese beetle* and the *Oriental beetle*, with the latter the chief offender.

MEDICINE

Anti-Histaminics Upset

One out of five persons taking anti-histaminic cold treatment will suffer unpleasant reactions. Rest in bed during the beginning of a cold is still recommended treatment.

► ABOUT one out of every five persons taking anti-histaminic pills for the common cold will be upset by them, Dr. Perrin Long, professor of preventive medicine at Johns Hopkins University School of Medicine, declared in Washington, D. C.

Dr. Long spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, radio program presented under the auspices of Science Service over the Columbia Broadcasting System.

Disturbances in appetite, lessened ability to perform their job, sleepiness, and palpitation of the heart are among the symptoms that come from anti-histaminics, in the experience of doctors who have prescribed them for hay fever and other allergies.

"While these symptoms are not hazardous," Dr. Long said, "in about five per cent of people who take anti-histaminic drugs they may be so intensive as to make them really serious because sleepiness, grogginess, lack of alertness, diminished power of concentration, and poor muscular coordination may result in ordinary accidents, accidents while operating machinery, and accidents while crossing the street.

"One can imagine the importance of the hazards which may be created by the use of these drugs if one visualizes several million people with diminished alertness and mental foginess driving on the streets and highways and operating machinery."

Under certain conditions anti-histaminic drugs will dry up the nasal discharge both in common colds and hay fever, Dr. Long explained. However, the ability of the drugs to stop nasal discharge is of relatively short duration and the drugs are "only pallia-

tive and not curative in their action," he stated.

The common cold attacks people at all stages of their lives. However, it is least common in babies under one year because of the baby's protected existence. From the first to the sixth year colds are most prevalent. Then comes a period of gradual decrease in number of colds, but at the beginning of the teen age there is another period of increased susceptibility. This lasts until the age of 25. After that, in the population at large, there is a gradual decrease in colds throughout the rest of the lifetime.

Asked what to do about colds, Dr. Long said: "Frankly, we can say, very little, except to stay at home in bed during the first 24 to 36 hours of the infection. If, after doing this, the cold does not improve, if headache occurs, if the voice is lost, if severe cough ensues, or if fever and the general feeling of illness persists, call your doctor and ask him to come and see you. Most colds are self-limited but a number of them hang on and produce secondary complications such as sinusitis, infection of middle ear, laryngitis, tracheitis, and even bronchitis and pneumonia. It is because of these complications that an individual with a cold should take care of himself in order to avoid them, and, if he is so unfortunate as to develop one of them, he should see his physician immediately."

And, he said, there is "not one iota of scientific evidence to back up the popular beliefs that sitting in drafts, getting one's feet wet, over-exerting, losing sleep and other factors supposed to lower resistance will predispose to colds."

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multiple curves of the lens, it was considered impossible to mass produce them, according to Dr. Tillyer.

The new process consists of making a special mold having wave-like curves that produce the desired shape in the finished lens. A ground and polished sheet of optical glass is placed on the mold and both are heated. One side of the lens then has the required Schmidt curves, and the other can be reground and polished as desired.

Secret of the mold lies in the materials of which it is made—kyanite and ball clay. The former has a tendency to expand, while the latter tends to contract.

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The first mechanical clock, invented about 990 A. D., had no hands but told the time by striking the hour or ringing a small bell.

Lead pencils originated in England soon after the discovery of graphite about 1560; the first pencils were made of graphite sawed into strips and inserted in lengthwise grooves in strips of wood.

The addition of chemicals called wetting agents to water makes water more effective in fire-fighting; the treated water spreads more easily and penetrates the burning materials more deeply.



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PHYSICS

Lenses Are Mass-Produced

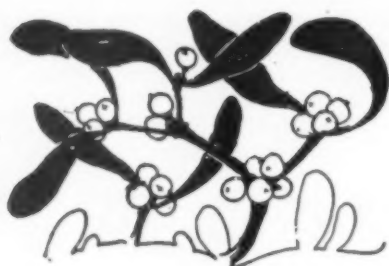
► MILITARY devices with uses not yet revealed by the government were possible during the war because of a secret method of producing Schmidt corrector plates disclosed in Southbridge, Mass. A Schmidt corrector plate provides a lens ten times faster than a high-speed camera lens.

Schmidt-type lenses today are used in the "Big Schmidt" camera on Mt. Palomar and in Schmidt cameras for mass public tests in the campaigns against tuberculosis as well as in secret military instruments.

Dr. E. D. Tillyer, inventor of the process

for which a patent has just been granted and research director of the American Optical Company here, discovered after the war that he had won a race with German scientists. They had been working night and day to perfect a method of mass-producing the lenses.

Prior to the war there were less than 50 lenses of the Schmidt correcting type in the world and these were used in high-speed astronomical photography, Dr. Tillyer states. These required weeks and sometimes months to make, and because of the mul-



Mistletoe

► MISTLETOE, which all over the country is making boys bold and girls blush, has many reputations. None are as romantic as the one we briefly bestow on it at the Yuletide season.

For one thing, during the workaday months of the year mistletoe is thought of, if at all, preeminently as a plant pest. It is a plant that grows on trees as a parasite. In Australia mistletoe has reached the status of a major pest. Its principal victim there is the eucalyptus tree, on which it has worked such damage that the weed killer 2,4-D is being used in a full scale campaign against it.

Mistletoe is native to both the Old World and the New, the two being different forms of the same family. Many legends and

charms were associated with the mistletoe in Europe. According to one belief, the mistletoe was once a full grown tree that grew like any proper tree on its own roots sunk firmly in the soil. Then, the legend has it, its timber was cut for the cross on which Christ was crucified. Since then it has dwindled to its present low estate, a dwarf and a parasite living off other trees.

The belief is still held in some of the more superstitious parts of Germany that mistletoe will make ghosts appear and if you talk to them they will answer you.

Among the ancient Druids, says Charles M. Skinner, mistletoe was a symbol of spirit, since it grew in the air on the sacred oak. At the year's end, a Druid priest in a white robe would cut the mistletoe with a golden sickle. A white cloth spread on the ground made certain that the twig did not touch earth.

The people would make charm bracelets and rings of the plant. Worn on the person or fastened over doorways, it was believed to have power to ward off evil.

The seeds of this parasitic plant, which has meant so many different things to different men and different ages, are given a wide range by the birds that feed on the berries. The seeds are sticky and they adhere to the bill of the feeding bird. Later the bird will clean his bill by rubbing it against the bark of a tree.

The seed sticks to the bark. Eventually it puts out a tap root which penetrates the bark and draws on the food circulating in the tree's sap.

Mistletoe has many facets: Cupid's ally, plant pest, magic charm, wood of the cross. It is also the official state flower of Oklahoma!

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ENTOMOLOGY

U. S. and Canada Blitz Common Foe: Mosquitoes

► A COMBINED airborne operation against an airborne foe has just been carried out jointly by defense agencies of Canada and the United States as scientists of the two countries leveled their deadliest insecticides against the arctic mosquito.

Airplanes operating in the Hudson Bay area sprayed wide swaths of enemy breeding territory, killing off the pestiferous little insects by the millions. The joint operation, organized to test the effectiveness of various insecticides in making the north country habitable for troops in the field, proved that DDT and parathion do an effective job in killing off the larvae.

Although DDT was used principally, parathion proved highly effective at even lighter dosages. Parathion, the U. S. Bureau of Entomology and Plant Quarantine explains, is so deadly a poison that it has not been recommended for general use by the public.

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On This Week's Cover

► NOVA Persei, a star that exploded in 1901 and out from which a gaseous shell has been growing ever since, is one of the objects recently photographed with the 200-inch Hale telescope at the Palomar Observatory. This photograph was taken as new tests of the giant instrument began, following a summer of repolishing portions of the surface of the mirror. Pictures such as this, taken to determine the 200-inch's resolving power, show that the perfection for which the astronomers were aiming has been achieved.

Nova Persei was only a very faint star of about 12th magnitude in 1901. Suddenly it exploded. Within 28 hours it became a moderately bright star of the third magnitude and could be seen with the naked eye. Within a year it had faded until it was only one-thousandth as bright as when it exploded. It continued to fade for about 20 years. Today its light varies between the 12th and 14th magnitude again and it can be seen only with powerful telescopes.

The nebulosity which now surrounds it became visible with telescopes six months after the outburst. This gaseous envelope has continued to increase steadily in diameter and at almost a uniform rate. Spectroscopic observations of the speed of the outward movement of the gas, combined with measurements of the expansion from many photographs like this, taken since it blew up, reveal its distance from the earth to be about 2,000 light years (one light year equals six million million miles).

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ASTRONOMY

Telescope Mirrors Heavens

► THE world's largest telescope, the 200-inch Hale telescope on Mt. Palomar, after having its face polished, is back at work mirroring distant universes with satisfactory accuracy.

Dr. Ira S. Bowen, director of Mt. Wilson and Palomar Observatories, when he received this year's Rumford Premium from the American Academy of Arts and Sciences at Boston described the first test observations.

One is a photograph of a star that exploded in 1901 and became so brilliant that it could be seen with the naked eye. Nova Persei has now faded to near its original faintness, visible in only the largest telescopes. The new Palomar photograph shows its gaseous shell in clear detail, although it takes light 2,000 years to reach the earth from this star.

A search of the heavens can now begin with the new giant telescope, Dr. Bowen indicates. Direct photographs will obtain

more information on the number of nebulae, like our Milky Way, and their distribution in space.

Spectrographic work will begin in March and will clock the velocities of the huge island universes moving out in space millions of light years from the earth.

Auxiliary equipment will be added to the Hale telescope in coming months. One supplementary lens will give the 200-inch telescope the same focal length as the 100-inch on Mt. Wilson and allow direct comparisons between photographs taken with both instruments. A Coude spectrograph will also be completed later.

In addition to polishing high spots around the outside edge of the mirror, a system of fans around the mirror and insulation prevent temperature changes from interfering with the definition of the mirror.

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Books of the Week

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BASIC THEORIES OF PHYSICS: Mechanics and and Electrodynamics—Peter Gabriel Bergmann—*Prentice-Hall*, 280 p., illus., \$5.00. An introduction to the theories of mechanics and electrodynamics on an advanced level. A basic text for introductory theoretical physics.

THE BORUCA OF COSTA RICA, Vol. XXVI, No. 2—Doris Z. Stone—*Peabody Museum of American Archaeology and Ethnology*, 50 p., illus., paper, \$2.50. An introductory report on the present-day Boruca Indians of southeastern Costa Rica.

BRAZIL WORLD FRONTIER—Benjamin H. Hunnicutt—*Van Nostrand*, 387 p., illus., \$6.00. A report on the present and future potentials. A social, political, and economic survey.

CANCER; What to Know, What to do about it—illus., paper, five cents; **CANCER OF THE BREAST**—20 p., illus., paper, ten cents; **CANCER OF THE FEMALE REPRODUCTIVE ORGANS**—20 p., illus., paper, ten cents; **CANCER OF THE DIGESTIVE TRACT**—24 p., illus., paper, ten cents; **CANCER OF THE MOUTH AND RESPIRATORY TRACT**—20 p., illus., paper, ten cents—*National Cancer Institute—Gov't. Printing Office*. Written in non-technical language, these pamphlets are intended to inform the laymen of the warning signs and symptoms, how to recognize them, and how to receive prompt medical attention.

EFFECT OF PERMANENT FLOODING IN A RIVER-BOTTOM TIMBER AREA—Lee E. Yeager—*Illinois Natural History Survey*, 65 p., illus., paper, free upon request to publisher, Urbana, Ill. Report on the Pere Marquette Wildlife Experimental Area.

ESSENTIALS OF ADOPTION LAW AND PROCEDURE—Federal Security Agency—*Gov't. Printing Office*, 27 p., paper, 15 cents. A guide to help modernize State adoption laws to protect the best interests of adopted children.

FRANCISCAN AWATOTVI: The Excavation and Conjectural Reconstruction of a 17th-Century Spanish Mission Establishment at a Hopi Indian Town in Northeastern Arizona, Vol. XXXVI—Ross G. Montgomery, Watson Smith, and John Otis Brew—*Peabody Museum of American Archaeology and Ethnology*, 361 p., illus., paper, \$5.85 (Cloth: \$8.35).

GEOLOGY OF THE COAST RANGES IMMEDIATELY NORTH OF THE SAN FRANCISCO BAY REGION, CALIFORNIA—Charles E. Weaver—*Geological Society of America*, Memoir 35, 242 p., illus., \$6.50.

HANDLING RADIOACTIVE WASTES IN THE ATOMIC ENERGY PROGRAM—*United States Atomic Energy Commission*, 30 p., paper, 15 cents. A non-technical report describing radioactivity and its biological effects.

IRON BLAST-FURNACE SLAG PRODUCTION, PROCESSING, PROPERTIES, AND USES—G. W. Josephson, F. Sillers, Jr., and D. G. Runner—*Gov't Printing Office*, 304 p., illus., paper, 75 cents. A report of the National Slag Association based on data gathered by the Problem Committee of the Association.

MENTAL HEALTH IS A FAMILY AFFAIR—Dallas Pratt and Jack Neher—*Public Affairs Committee*, 31 p., illus., paper, 20 cents. Presents some of the causes of personality problems

in families and suggests some preventive methods.

NEVER TOO OLD—*New York State Joint Legislative Committee on Problems of the Aging*, 216 p., illus., paper, free upon request to the publisher, 94 Broadway, Newburgh, N. Y. Intended to help pave the way for better understanding of the needs and capabilities of our oldsters.

NEW YORK UNIVERSITY—BELLEVUE MEDICAL CENTER: Annual Report 1948-1949—*New York University-Bellevue Medical Center*, 64 p., illus., paper, free upon request to publisher, 477 First Avenue, New York 16, N. Y. A report of the important developments of the medical center's first full year of operation.

1949 FACTS ABOUT NURSING—*American Nurses' Association*—12th ed., 94 p., illus., paper, 50 cents. Latest available basic data.

PREDICTING SUCCESS IN PROFESSIONAL SCHOOLS—Dewey B. Stuit and others—*American Council on Education*, 187 p., \$3.00. A report on the effectiveness of educational and vocational counseling.

THE QUESTION OF ESTABLISHING UNITED NATIONS RESEARCH LABORATORIES—Department of Social Affairs—*United Nations*, 290 p., paper, \$2.00. Leading authorities discuss the pros and cons of establishing international research laboratories.

RESEARCH IN REVIEW: Sixth Report, 1949—*Sugar Research Foundation*, 45 p., paper, free upon request to publisher, 52 Wall Street, New York 5, N. Y. Trends and achievements in sugar research.

SAFE HANDLING OF RADIOACTIVE ISOTOPES—National Bureau of Standards—*Gov't. Printing Office*, 30 p., illus., paper, 15 cents. A handbook giving general recommendations suitable for typical laboratory or small industrial operations.

SELENIUM—Sam F. Trelease and Orville A. Brath (Publisher's address: Sam F. Trelease, Box 42, Schermerhorn Hall, Columbia University New York 27, N. Y.), 292 p., illus., \$5.50. Its geological occurrence and its biological effects in relation to botany, chemistry, and agriculture, nutrition and medicine. The first literature citation is to an article by Science Service on "A disease supposed to be due to grain."

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INDUSTRY

Cheaper Paper from Wheat Straw Is Promised

➤ A NEW grain belt industry, paper from wheat straw, may result from cheap water transportation resulting from current river development schemes, W. J. Promersberger, professor of agricultural engineering at North Dakota Agricultural College in Fargo, N. D., predicts.

Wheat straw is known to make good packaging paper, box board and building board. Transportation costs have been too high for profitable commercial manufacture. Shipping over 100 miles makes the

price of the finished product prohibitive.

This obstacle will be overcome, Prof. Promersberger believes, when large bodies of dammed water become available close to the wheat fields.

"It is not outside the realm of possibility that the Missouri-Souris development will overcome this shortage," he said. "Perhaps some day we shall see near Garrison, N. D. dam, or near some other dam, a paper board factory lying in the midst of a wide area of cheap straw, with both cheap water and cheap fuel—lignite—right at hand."

Science News Letter, December 24, 1949

High-frequency radio signals in an atmosphere of certain gases are used in a new process to obtain temperatures high enough to melt tungsten, the melting point of which is about 3370 degrees Centigrade.

RADIO

Saturday, December 31, 3:15 p. m., EST

"Adventures in Science" with Watson Davis, director of Science Service over Columbia Broadcasting System.

Mr. Davis will broadcast a "Report from American Association for Advancement of Science" from the annual meeting in New York at which time he will bring to the microphone scientists who have made the most interesting and important announcements during the week.

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Top Patents of The Year

If you want the patent number of the inventions described here send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington, 6, D. C. and ask for Patent Bureau Bulletin 1949

Notable and interesting inventions patented during the year include:

A bonding process for putting a protective coating of aluminum on steel by use of a fine iron coating on the steel deposited electrolytically as a bonding agent.

A method of navigation and orientation by picking up very short radio waves emitted by the sun and other stars which can be received in any weather.

Improved chemical process for extracting industrially useful sugars from wood.

Synthesis gas made by partial combustion of coal or lignite in underground seams and piped to the surface for use.

Wool made non-shrinking by exposing it to sonic vibrations intense enough to cook an egg, thus coagulating the wool proteins.

A way to freeze eggs without breaking the shells by removal of a little of the moisture inside the shell; this preserves the eggs for later table use in fresh egg condition.

A radio device which will be ejected from an airplane about to crash and will automatically and periodically broadcast distress signals.

An improved process for producing phosphate fertilizer by charging a vertical smelting furnace with mixture of phosphate and silica and absorbing the fluorine with water vapor produced during combustion of the fuel.

A process for concentrating uranium out of its ores by heating the lower oxide of uranium in the presence of oxygen under pressure.

An air-conditioning system for mines which cools and dries the air and returns it as near as possible to the working face.

A process for preparing vitamin K in forms that will keep longer without deterioration.

Use of flame instead of steel blades for thinning out cotton plants by machine.

A low-temperature process for totally converting coal into oil under moderate pressure.

Use of short-length radio waves focussed by mirror-back oscillators to make the basis of nitrate fertilizers and other chemicals out of air and other gas mixtures.

A high-pressure, high-temperature turbine run by hot air instead of combustion and thus not so much subject to corrosion.

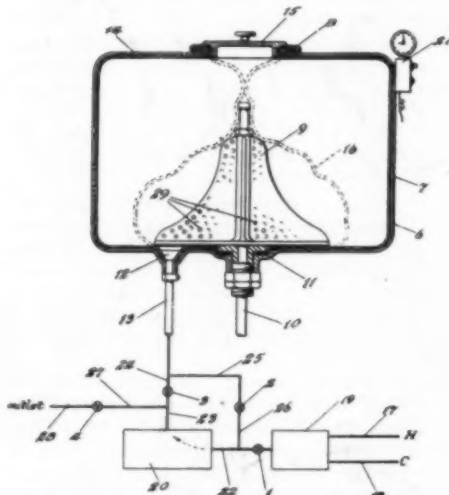
Device for making it possible to telephone by means of a pair of flashlights, incorporating in one ordinary powerful flashlight a telephone transmitter with circuit hookup to cause the lamp current to fluctuate in tune with the spoken message, and in the other a lens, for focussing, amplifying hookup and telephone receiver.

Design for jet-propelled airplane which would have propellant gases streak in a solid sheet from the trailing edges of their wings.

Design for a steam turbine in which steam jets from a central disk-shaped stator are delivered into a ring-shaped body of water whirled around in a rotating casing.

A machine for harvesting vegetables such as celery, broccoli and cauliflower, making use of an inverted u-shaped frame, side-mounted on a tractor, with two rotating cutting bands, one just under root level, the other to sheer off excess tops.

Production of nickel, either pure or in ferromagnetic form, from low-grade ores by a process for separating out the magnesia.



A washing machine that uses air pressure to squeeze the water out of the clothes while still in the washer.

Method for sending radio-frequency energy along pipes such as city water pipes or gas pipes or along railroad rails.

Revival of Langley's aerodynamic idea in the design of a flying boat having two pairs of wings mounted in tandem with multiple engines mounted on the leading edge of the trailing pair.

Control apparatus for a coin-operated type-

writer in public places, which limits the use of the typewriter to a certain period of time after coin is inserted.

A method for producing a concentrated olive essence from olive pits which can be used to convert less esteemed food oils into imitation olive oil.

A tea concentrate made by steeping the leaves at boiling-water temperature and condensing the aromatic steam distillate.

Method for discharging static charges on vehicles on the highway by means of a flexible upright-projecting metal rod that makes contact with passing cars.

A jet-propulsion unit for use in water instead of air and using fuel that is "burned" by reaction with water.

Prompting of television actors by directed, short-range, short-wave radio.

Method for separating fresh corn from cob without injury by bursting the cob into fragments, each carrying a separate grain.

Explosive bursts releasing clouds of bright varicolored smoke for use in daytime fireworks or for determining accuracy of artillery fire.

A machine for automatically heating pre-packaged hot-dogs.

A hybrid aircraft with ordinary airplane wings and two larger-than-ordinary pusher propellers, variable in both pitch and speed, which can be swung through 90-degree arcs to push vertically, helicopter-wise, for take-off, landing, and hovering, or to push horizontally when the plane is in flight.

Method for making insecticide sprays stick to plants by giving each particle an electrostatic charge induced by ejecting the spray at velocity greater than that of sound.

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